NORTHWEST MOUNTAIN REGION RUNWAY INCURSION ACTION TEAM VISIT
King County International Airport / Boeing Field
May 24, 2001

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Northwest Mountain Region
Federal Aviation Administration

Definition
of Runway Incursion

Any occurrence at an airport involving:

- **an aircraft**

- **a vehicle**

- **a person**

- **or an object**

on the ground that creates a collision hazard or results in loss of separation with an aircraft taking off, intending to take off, landing, or intending to land.
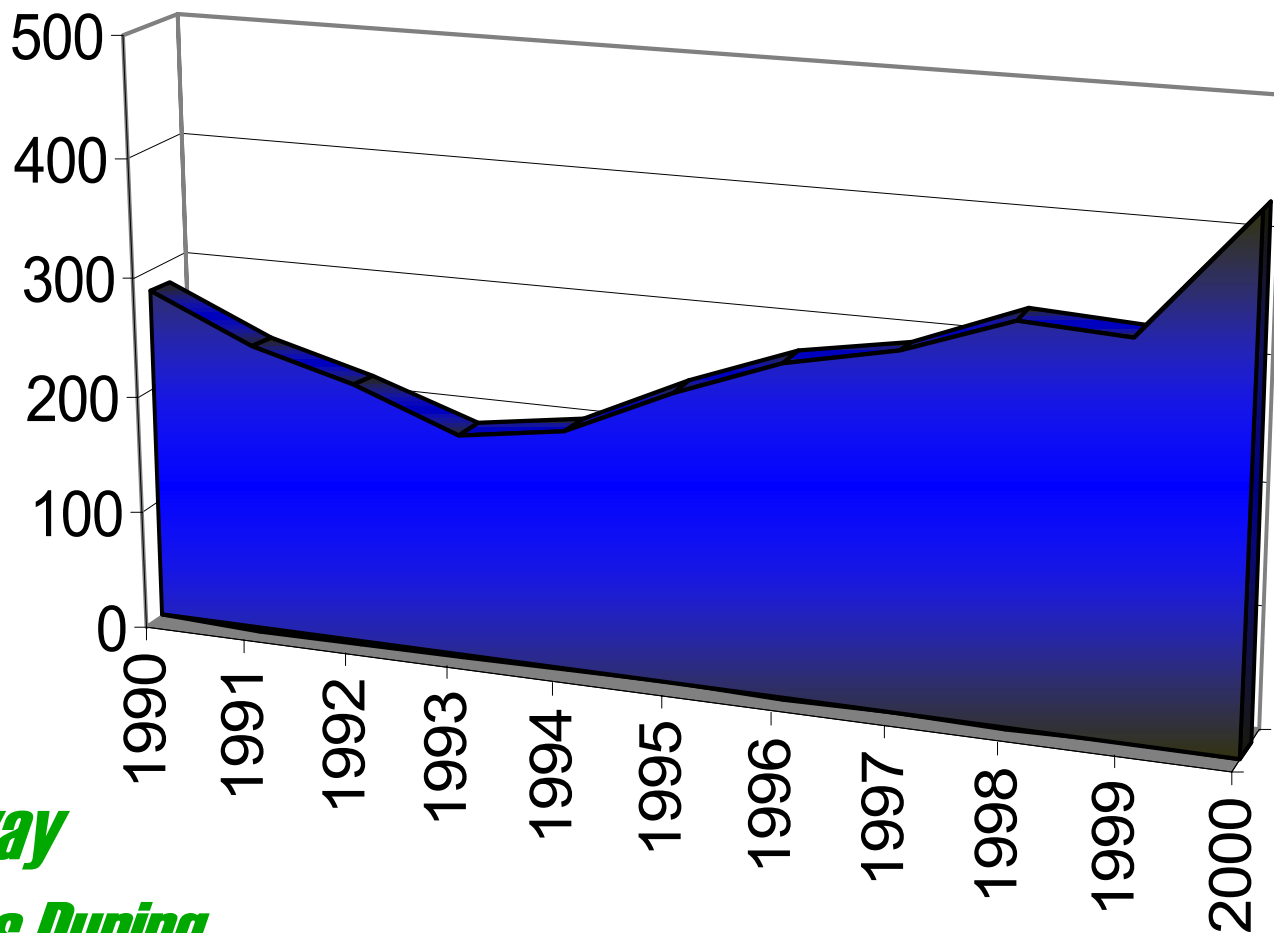
Sedan versus DC-10

Runway Incursion Types

Runway incursions result from three types of surface incidents:

- **Operational Errors (OE)**

- **Pilot Deviations (PD)**

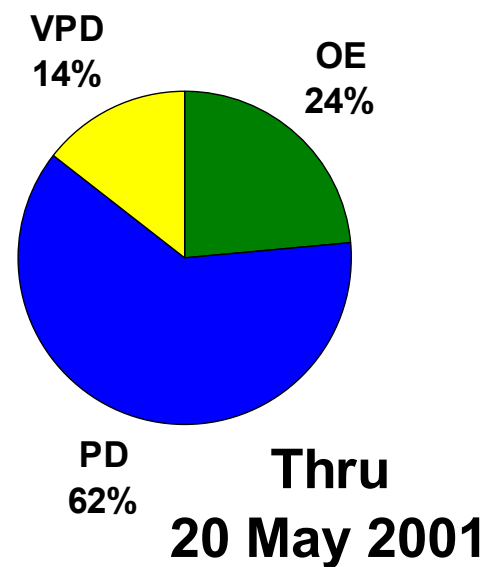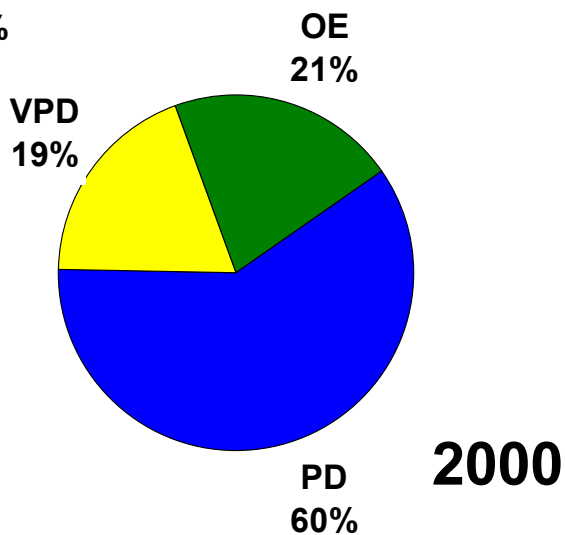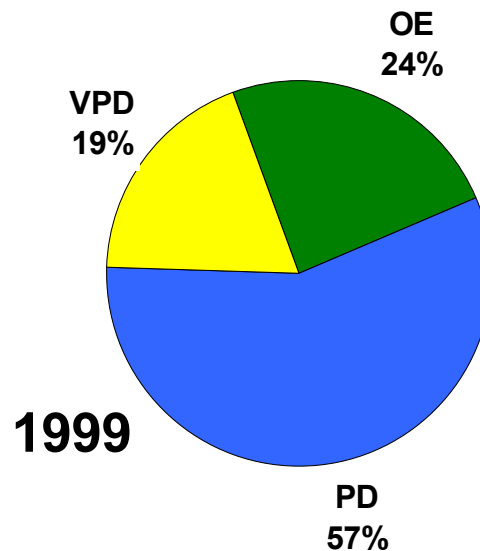- **Vehicle/Pedestrian Deviations (V/PD)**

Trends

500
400
300
200
100
0

1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000

431 Runway Incursions During CY 2000

Trends - **Incursions by type**

1998
- OE 28%
- VPD 16%
- PD 56%

1999
- OE 24%
- VPD 19%
- PD 57%

2000
- OE 21%
- VPD 19%
- PD 60%

Thru 20 May 2001
- OE 24%
- VPD 14%
- PD 62%

Trends

Other 1%

Commercial 23%
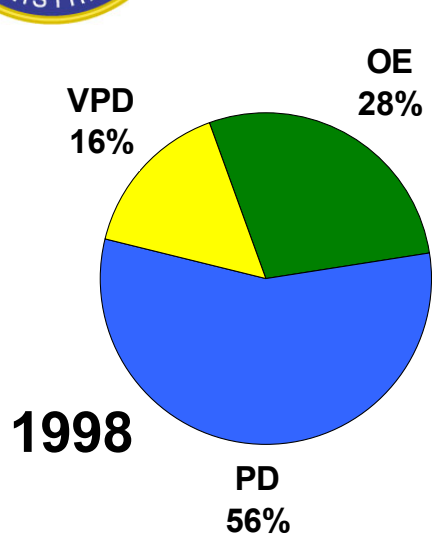
Pilot Deviations by operations type
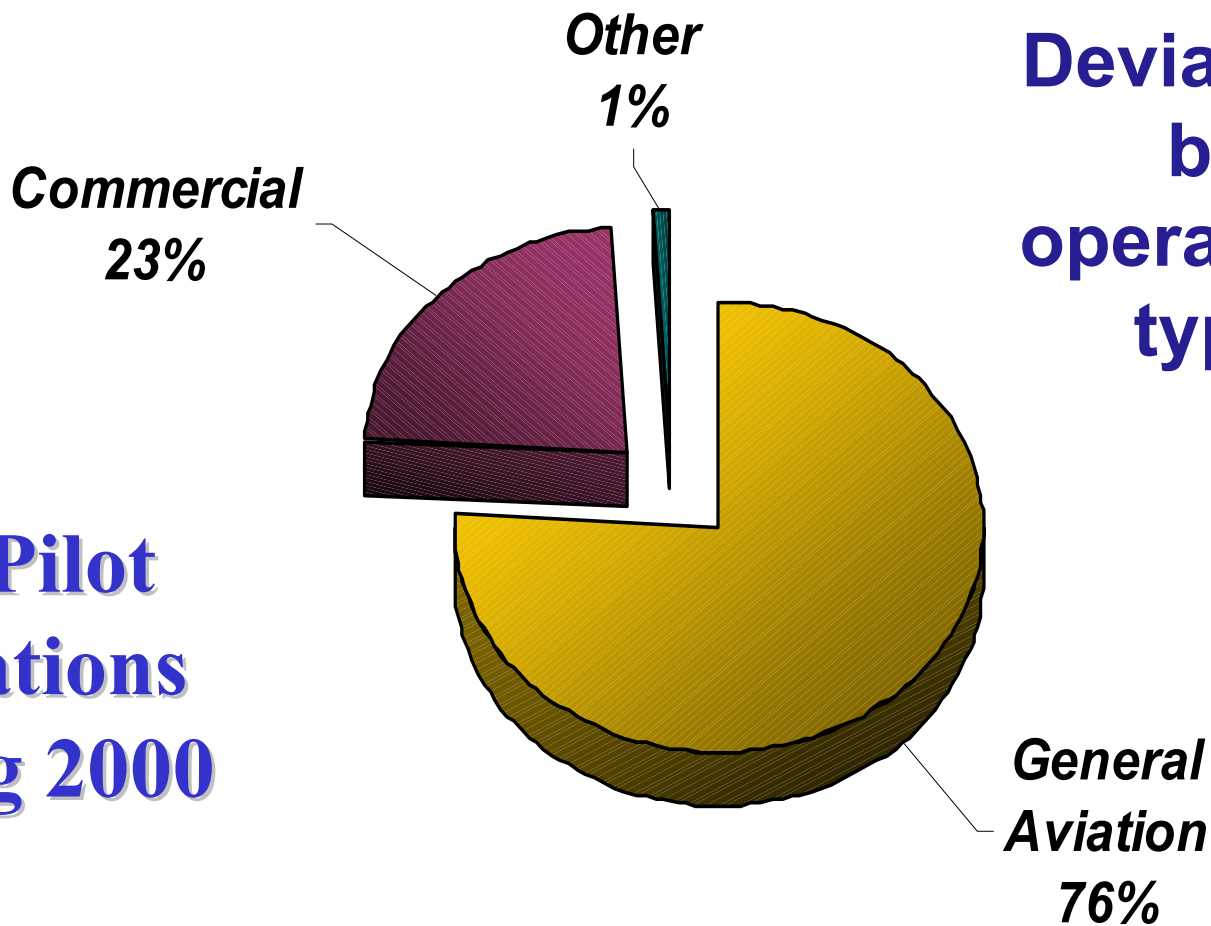
256 Pilot Deviations during 2000

General Aviation 76%

Top Incursion Airports
CY 2000

LOCATION	LOC ID	OPS	RI	RATE
North Las Vegas Arpt, NV	VGT	229,703	16	6.97
Montgomery Field/San Diego, CA	MYF	260,235	9	3.46
Fort Lauderdale Exec, FL	FXE	263,359	9	3.42
Merrill Field, Anchorage, AK	MRI	201,148	8	3.98
Long Beach Arpt, CA	LGB	416,766	8	1.92
Logan Arpt, Boston, MA	BOS	512,985	8	1.56
Los Angeles, CA	LAX	786,421	8	1.02
Jeffco Arpt, Denver, CO	BJC	177,319	7	3.95
Concord Arpt, CA	CCR	212,112	7	3.30
Orange Co/John Wayne Arpt, Santa Ana, CA	SNA	405,473	7	1.73
Santa Barbara, CA	SBA	163,865	6	3.66
Lambert Fld, St. Louis, MO	STL	490,779	6	1.22
Phoenix Sky Harbor Arpt, AZ	PHX	632,360	6	0.95
Troutdale Arpt, OR	TTD	76,252	5	6.56
Teterboro Arpt, NJ	TEB	272,201	5	1.84

Top Incursion Airports
CY 2000

LOCATION	LOC ID	OPS	RI	RATE
San Jose Arpt, CA	SJC	300,365	5	1.67
Bridgeport, CT	BDR	90,760	4	4.41
Greater Rockford Arpt, IL	RFD	94,571	4	4.23
McGhee Tyson Airport Knoxville, TN	TYS	152,330	4	2.63
Providence, RI	PVD	157,470	4	2.54
Sarasota/Bradenton Arpt, FL	SRQ	174,515	4	2.29
Palwaukee Muni, Chicago, IL	PWK	185,236	4	2.16
Albuquerque, NM	ABQ	233,632	4	1.71
Midway Arpt, Chicago, IL	MDW	303,192	4	1.32
Salt Lake City, UT	SLC	370,681	4	1.08
San Francisco, CA	SFO	437,186	4	0.92
Newark, NJ	EWR	461,457	4	0.87
Cincinatti-Covington Arpt, OH	CVG	486,590	4	0.82
O'Hare, Chicago, IL	ORD	914,131	4	0.44

Sweeper versus DC-9

RISK ASSESSMENT

Why We Assessed Data

- As a result of feedback from 2000 Summit, needed to place runway incursions into another context

- Need a better way to track incursions

- Need a better understanding of where incursions happen

- Need a way to analyze data to get at causal factors

- Need to describe clearer picture of runway incursion incidents – *Not every incursion is a Tenerife*

What Was Done

- Formed a team of "experts" to assess incursions in detail

- Developed four runway incursion categories – coordinated with ASD and other agency analysis activities (Dr. A. Barnett)

- Mitre and NASA ASRS observed and validated the process

Definitions

A Separation decreases to a point where the margin of safety is so low that the participants <u>barely avoid a collision</u>.*

B Separation decreases to a point where a <u>significant potential for a collision</u> existed.

C Separation decreases, or the potential for separation to decrease exists, <u>but ample time and distance exist</u> to avoid a potential collision.

D Meets the definition of a runway incursion, with <u>little or no risk of a collision</u>.

* **The data contained in category A includes all accidents that occurred as a result of runway incursions (1997-2000), one in LaGuardia, NY & one in Sarasota, FL.**

Assessment Process

Evaluated over 1350 incidents – all incursions during 1997 – 2000 – *one at a time*

– Projected airport diagram

– Projected all reported incident information

– "Walked-thru" incident and discussed event

– Reached Team consensus and assigned collision risk category (A-D)

– Asked 20+ questions for every incident to collect additional data

– Marked incident location on airport diagram

Additional Details Now Available

- Airport
- Date & Time
- Incursion Type
- Operation Type
- Callsigns
- Type Aircraft
- Phase of Flight
- Combined Positions
- Construction
- Foreign Carrier
- Non-Pilot
- Vehicle Type
- LAHSO
- Intersecting Runways
- Confusing Intersection
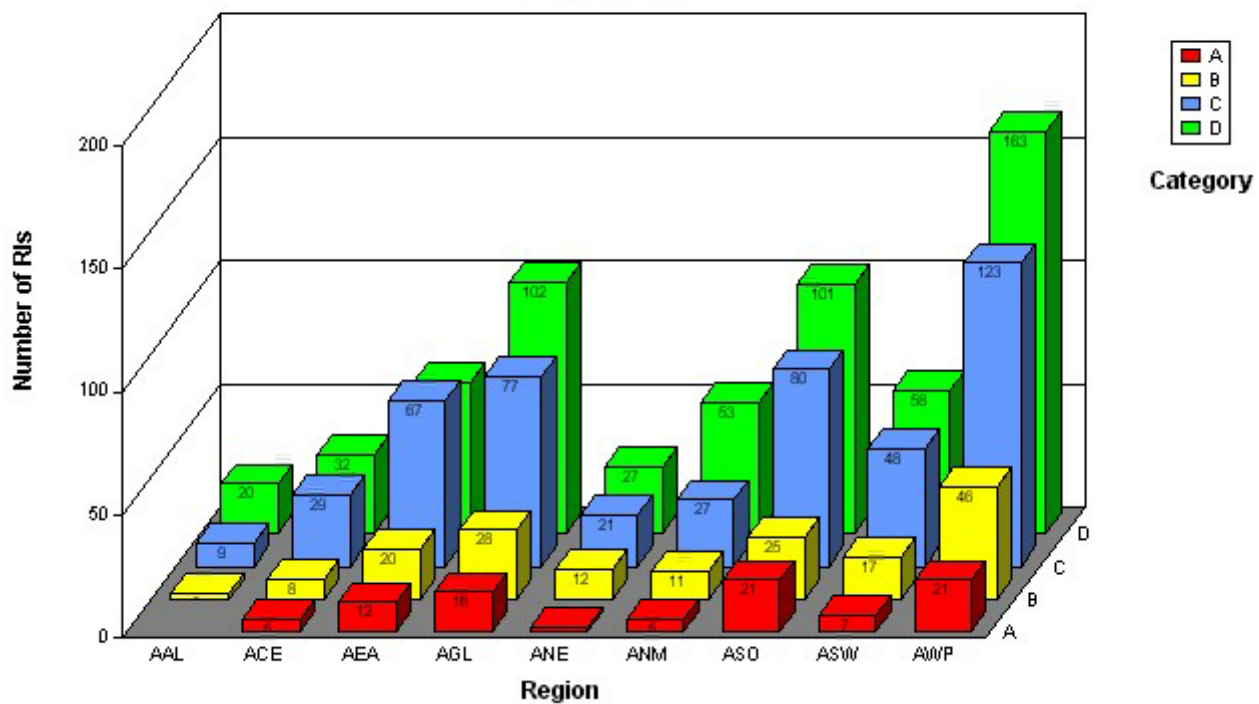- Low Visibility
- Training (pilot/controller)
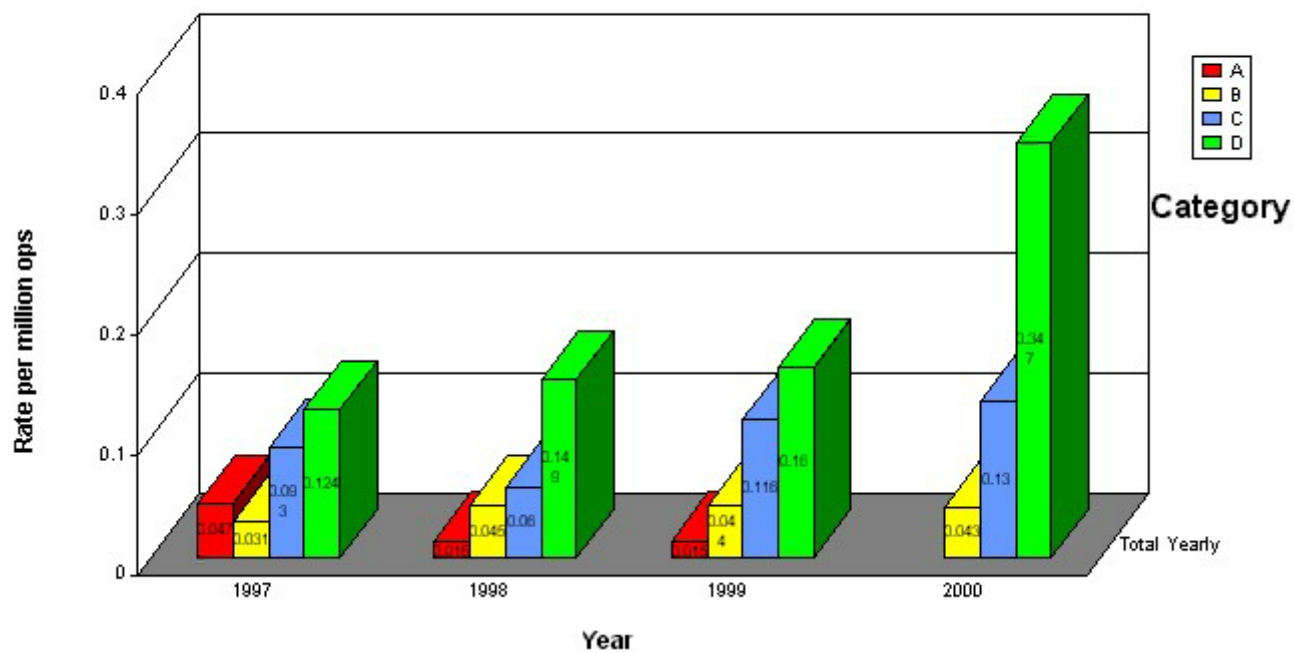- Hold Short

National
Runway Incursion INCIDENTS
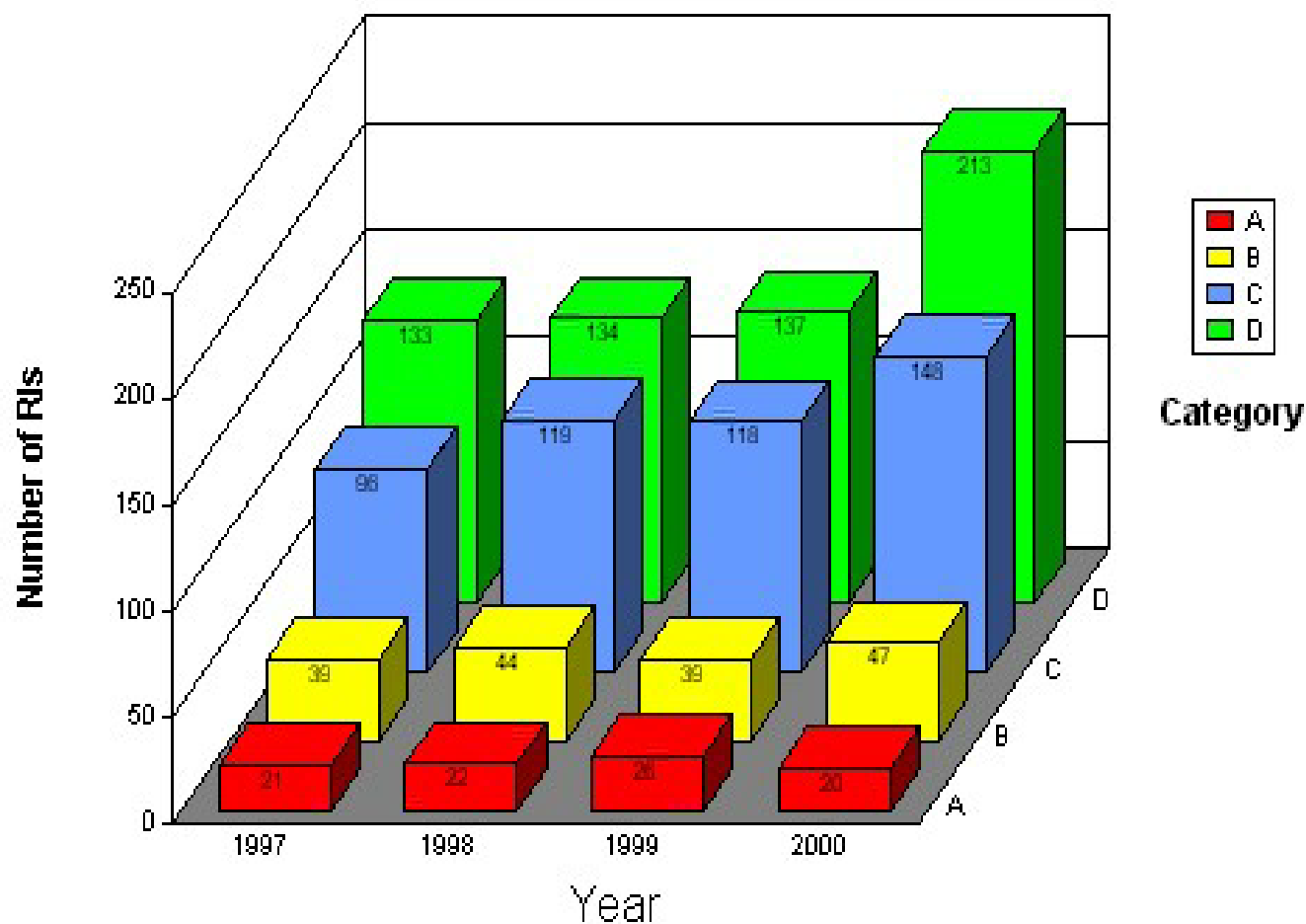
REGIONAL
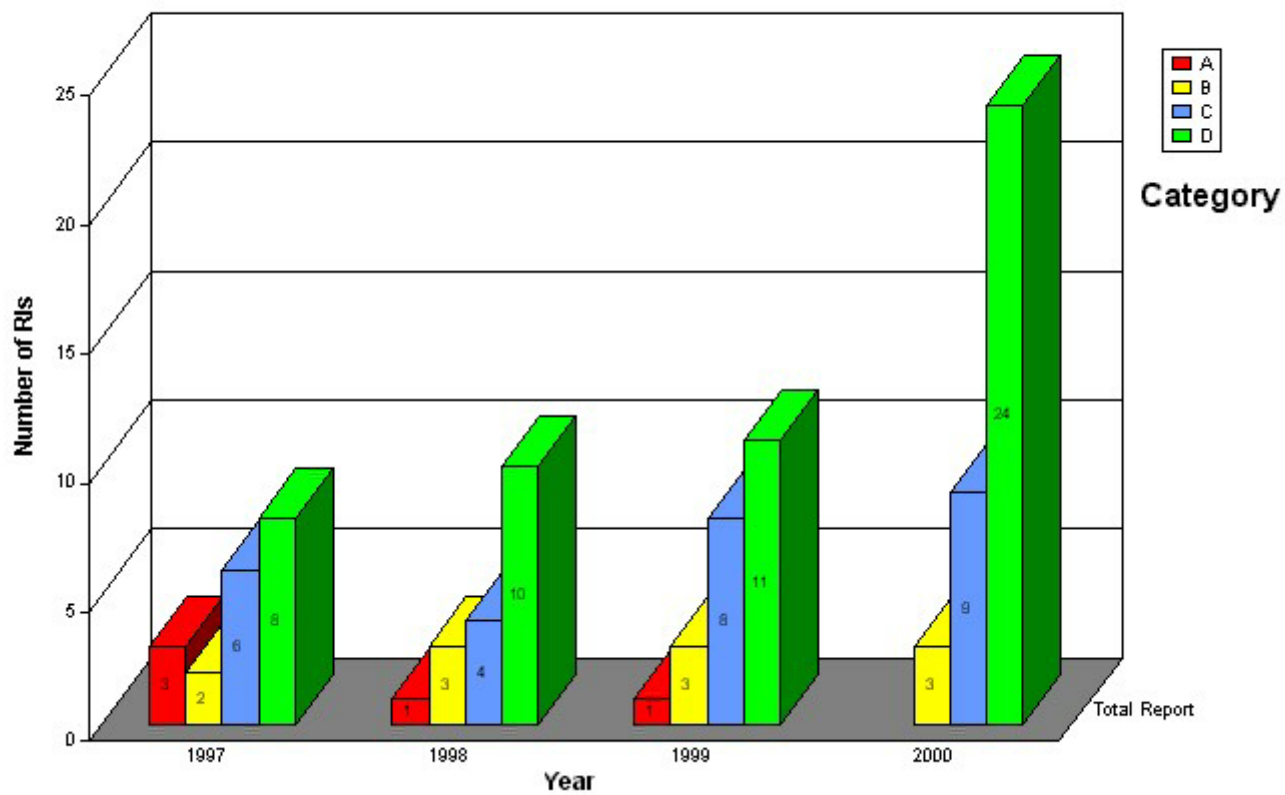Runway Incursion INCIDENTS
1997 - 2000

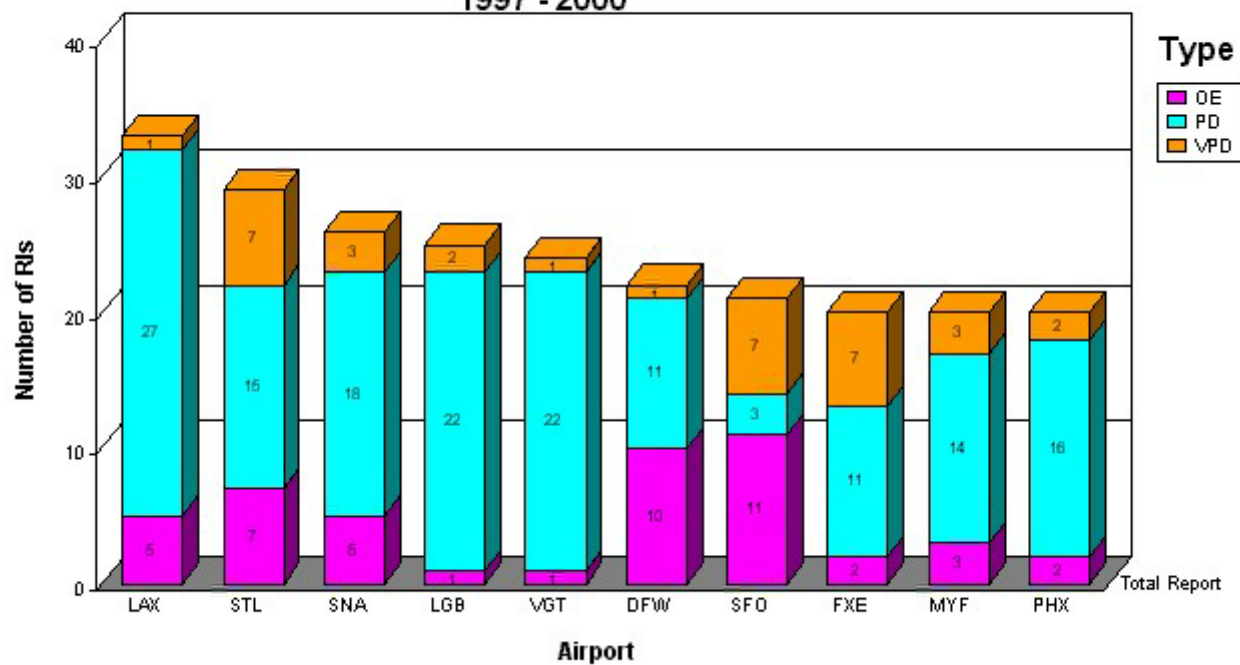Northwest Mountain Region
Runway Incursion RATE

Northwest Mountain Region
Runway Incursion INCIDENTS

Top 10 Airports
Runway Incursion TYPE
1997 - 2000

Primary Causes of Runway Incursions

- Breakdown in Pilot/Ground Vehicle/Controller Communications

- Lack of Airport Familiarity

- Loss of Situational Awareness

What Happened with My Suggestion?

- Nearly 1,000 recommendations from:
  - Regional Workshops / National Summit
  - NTSB / JSAT / GAO /aviation industry; etc
- 'Rolled up' into 50 larger solutions
- Ten Action Items for fast track implementation

  Became the TOP TEN

Top Ten Initiatives

- 1. <u>Enhanced Operational Tower Controller Training</u>

  - LOB: Air Traffic
  - Modify existing OJT training course to place a higher priority on maintaining situational awareness and prioritization when applying anticipated separation
  - Computer Based Instruction-Develop Runway Incursion specific training to be administered prior to local control certification and establish recurring training requirements.
  - Status: Finalizing workgroup participants with NATCA

Top Ten Initiatives

- 2. <u>Foreign Air Carrier Pilot Training, Education and Awareness</u>

  - LOB: Flight Standards
  - Program to increase awareness and prevention of RIs within international aviation community
    - Two Tasks:
    - Develop fast process for inspectors to determine a pilot's level of English proficiency
    - Identify a process that will help foreign air carriers to achieve a 50% + compliance with level2 English proficiency (2002 – 2005)
  - Status: Focal point (Bob Hall – DFW) is assembling team from IFOs, contractors, and ICAO to establish charter. Action plan expected 2/01.

Top Ten Initiatives

- 3. Advisory Circular for Airport Surface Operations

  - LOB: Flight Standards
  - Standard operating procedures for airport surface operations. Applicable to Part121,129, 125, 135, and 91 operators. Covers cockpit issues such as planning, situational awareness, techniques for transiting complex intersections, intra-cockpit coordination and communications with ATC.
  - Status: Completed and signed by AFS-1. Currently in Federal Register for 30 day comment period. AC will be published after reviewing comments at the end of the 30 day period.

Top Ten Initiatives

4. Airport Markings

- LOB: Airports
- Increase the visibility of runway hold line markings. Change existing A/C to require double-sized markings (outlined in black with glass beads) at all certificated and towered airports.
- Status: Change to AC has been accomplished

Top Ten Initiatives

5. <u>Education, Training, and Awareness for Pilots, Controllers, and Vehicle Operators</u>

- LOB: ATS-20

- Develop a resource library of RI materials available at RSP Web Site and linked to other aviation safety sites.

- Status: Final workgroup was conducted December 5, 2000. Estimated completion date is March 30, 2001.

Top Ten Initiatives

6. <u>Memory Enhancement Techniques for Tower Controllers</u>

- LOB: Air Traffic
- Techniques to enable tower controllers to manage working memory more effectively
- Status: Finalizing workgroup participants with NATCA

Top Ten Initiatives

- 7. Pilot – Controller Phraseology Review

  - LOB: Air Traffic
  - A comprehensive assessment of required pilot - controller surface operations phraseology. Objective is to reduce communications workload by condensing, modifying, or eliminating verbiage. Includes harmonizing phraseology with ICAO.
  - Status: Finalizing workgroup participants with NATCA.

Top Ten Initiatives

- 8. <u>Improved Pilot Evaluation and Testing</u>

  - 🔵 LOB: Flight Standards
  - 🔵 Evaluate ground operations performance and test for knowledge of signs, lighting, and marking during all initial certification check flights. Flight instructors and Designated Pilot Examiners will test surface operations knowledge during recurrent evaluations.
  - 🔵 Status:
    - 🔵 Airline Transport Pilot and Certified Flight Instructors Practical Test Standards have been modified
    - 🔵 Private, Commercial, and Instrument Practical Test Standards are in the process of being modified
      - 🔵 Projected completion expected by end of June 01

Top Ten Initiatives

9. <u>Air Traffic Teamwork Enhancement (ATTE) Training for Tower Controllers</u>

- LOB: Air Traffic

- Conduct ATTE training at 10 facilities that have the highest number of RIs resulting from operational errors.

- Status: Finalizing workgroup participants with NATCA

  ATTE Facilities: BOS, BUR, DFW, LGA, MDW, MKE, PBI, SFO, SJC, & TEB

Top Ten Initiatives

- 10. <u>Technology Assessment</u>

  - The FAA has a number of technology programs underway aimed at improving runway safety. They include the following:

  - Airport Surface Detection Equipment, Model 3 (ASDE-3)

  - Airport Movement Area Safety System (AMASS)

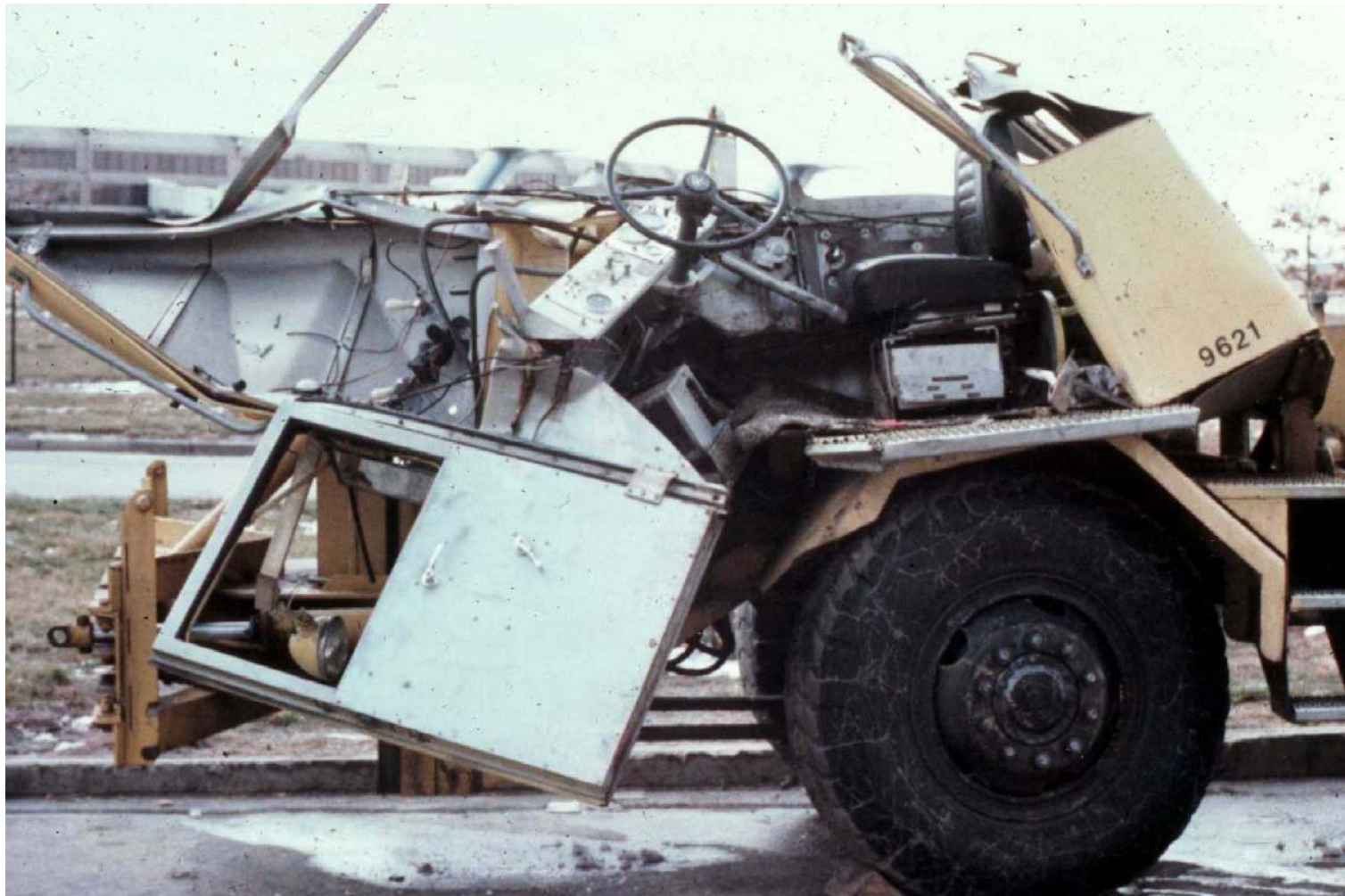 - Airport Surface Detection Equipment, Model X (ASDE-X)

Top Ten Initiatives

- 10. <u>Technology Assessment Continued</u>

⬤ Safeflight 21 (SF-21)

⬤ In addition, the FAA issued a Broad Agency Announcement (BAA) seeking proposals for new and emerging runway safety technologies.
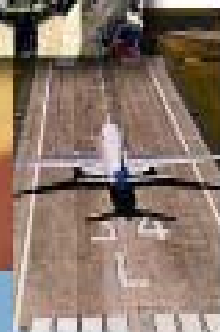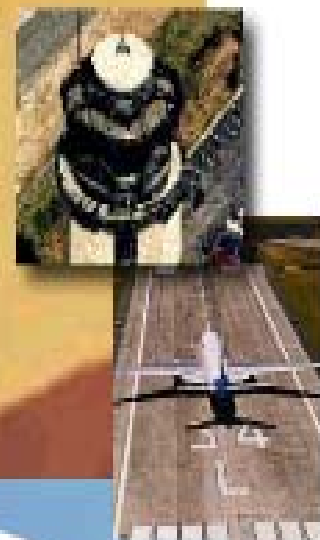
Snow Plow versus Wingtip

Runway Safety Program

www.faa.gov/runwaysafety

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Runway Safety Program
on the ground

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Create your own Airport Runway Safety Website, *FREE*!

In an effort to promote safer surface operations, the Runway Safety Program now offers all airports, regardless of size or use, the ability to create their own websites. Airports can now inform the flying public about airport hot spots, local procedures, operations, runways specifications, communications, and much more. Airports will even have the option of posting pictures and diagrams. ▶ create website

Airport Signs, Markings & Lighting

Knowing airport signs, markings & lighting is the cornerstone to safe surface operations. Take a few minutes and review the current standards. ▶view
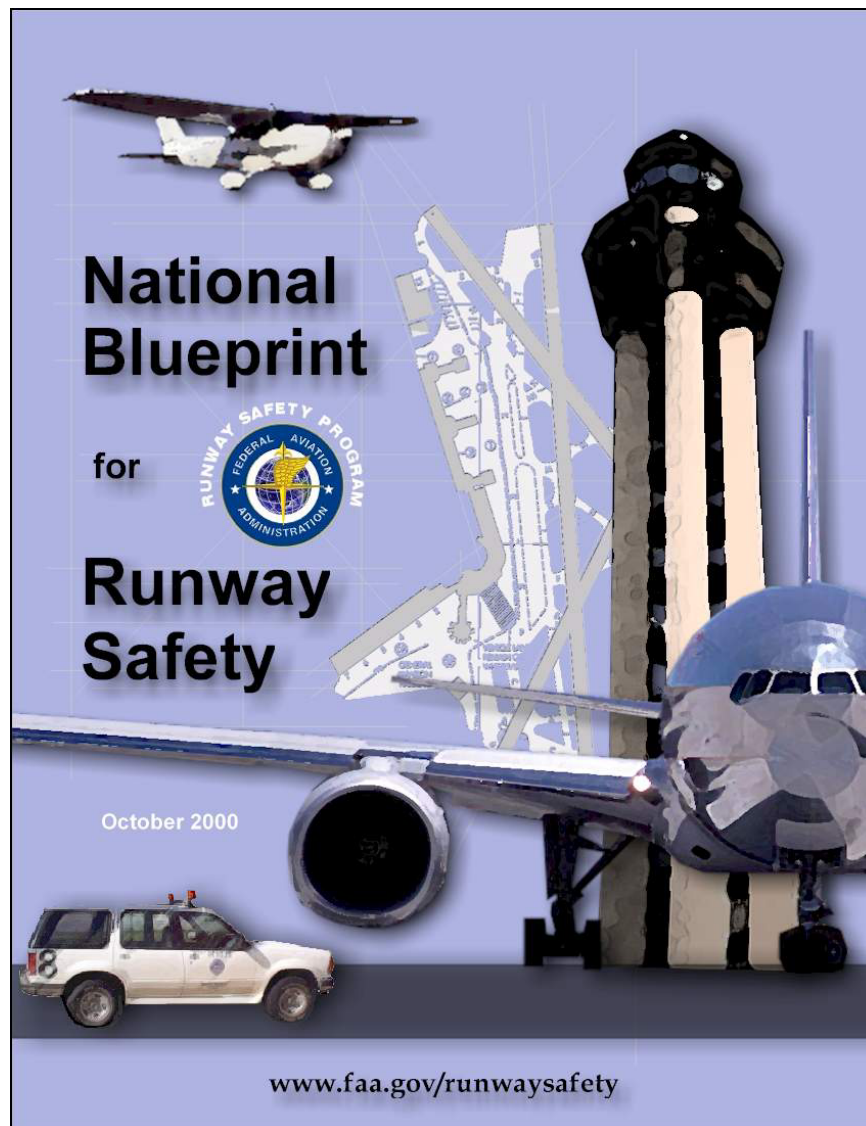
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We Listen...We Respond   Internet

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Address http://www.faa.gov/runwaysafety/

Runway Safety Program

statistics & data

STATISTICAL DATA

Runway Incursion Totals CY00 vs. CY99 (Updated Daily)

Regional Runway Incursion Totals - CY00 (Updated Daily)

Runway Incursion Totals CY00 vs. CY98

2000 Runway Incursion Reduction Goal

Runway Incursions by Category (1988-1999)

Runway Incursions by Month (1997-1999)

Runway Incursion Rates with Total Operations (1988-1999)

Quarterly Operational Errors (1997-1999)

Quarterly Pilot Deviations (1997-1999)

Pilot Deviations by Part (1997-1999)

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We Respond   We Listen...   Internet

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National
Blueprint

for

Runway
Safety

October 2000

www.faa.gov/runwaysafety

ANM Points of Contact
(ANM Runway Safety Team)

- *Runway Safety Program Manager, ANM-1R, Jim Greene, (425) 227-1369   Jim.k.greene@faa.gov*

- *Airports Division, ANM-600, Mark Taylor, (425) 227-2625 Mark.taylor@faa.gov*

- *Flight Standards, ANM-200, Mary Hoy, (425) 227-2262 Mary.Hoy@faa.gov*

- *Airway Facilities Operations, ANM-400, Willie Eigner, (425) 227-2336   Willie.eigner@faa.gov*

- *Air Traffic Control, ANM-500, Don Bringmann, (425) 227-2550 Donald.bringmann@faa.gov*

We Listen….
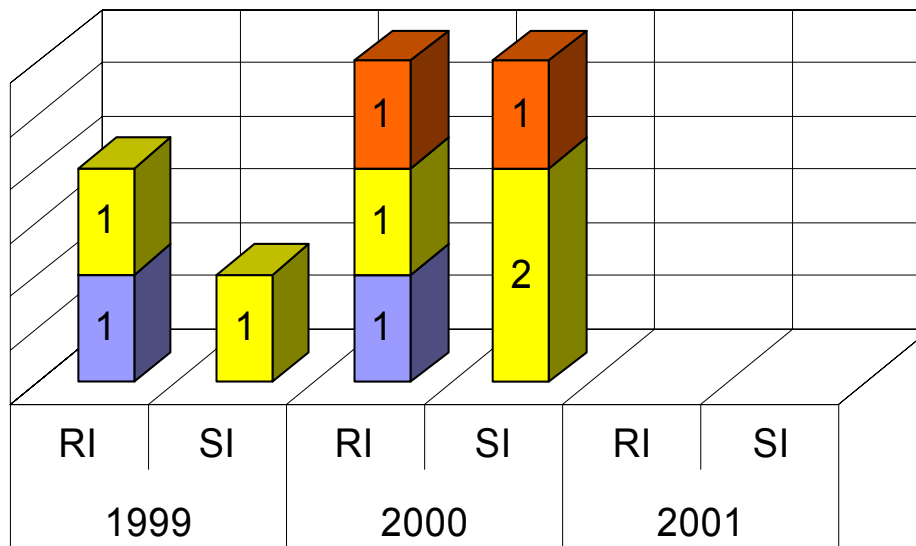
We Respond

Pickup Truck versus B-747

Local Problems require local Solutions

Recent Data for
King County International Airport

Runway Incursions & Surface Incidents 1999-2001

AIRCRAFT MOVEMENT AREA

STOP

DO NOT PROCEED
WITHOUT CLEARANCE
FROM PAINE TOWER

VEHICLES REQUIRE A
FLASHING AMBER BEACON

AIRCRAFT MOVEMENT AREA

DO NOT PROCEED
WITHOUT CLEARANCE
FROM PAINE TOWER

STOP

VEHICLES REQUIRE A
FLASHING AMBER BEACON

AIRCRAFT TAXIWAY
TOWER CLEARANCE REQUIRED

**GATE
E-3**

**YOU ARE ENTERING AN AIR OPERATIONS AREA
AUTHORIZED VEHICLES & PERSONNEL ONLY**

VIOLATORS MAY BE PROSECUTED UNDER SNOHOMISH COUNTY CODE 15.08.651

STOP ON YELLOW LINE UNTIL GATE IS FULLY CLOSED BEHIND YOU

UNESCORTED FOLLOW-THROUGH VEHICLES ARE PROHIBITED
PLEASE REPORT VIOLATORS TO AIRPORT SECURITY 353-1606

DO NOT CROSS ▬▬▬▬ WITHOUT ATC AUTHORIZATION

YIELD TO ALL AIRCRAFT
SPEED LIMIT 15

Local Problems require local Solutions

- Airport Traffic Control Tower

- King County International Airport